

5 What is claimed is:

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8 1. A bipolar transistor structure comprising:  
9 a collector region having a first conductivity type formed in  
10 a semiconductor substrate;  
11 a base region having a second conductivity type opposite  
12 the first conductivity type formed on the collector region, the  
13 base region including a lower highly doped layer formed on the  
14 collector region and a relatively low doped upper layer formed on  
15 the lower layer; and  
16 an emitter region having the first conductivity type formed  
17 on the upper layer of the base region.

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19 2. A bipolar transistor structure as in claim 1, and  
20 wherein the base region comprises a silicon/germanium (SiGe)  
21 layer that includes a lower highly doped SiGe layer formed on  
22 the collector and a low doped upper SiGe layer formed on the  
23 lower layer.

24 3. A bipolar transistor structure as in claim 2, and  
25 wherein the dopant in the both the lower SiGe and the upper SiGe  
26 layer comprises boron.

27 4. A bipolar transistor structure as in claim 1, and  
28 wherein the base region comprises a silicon/germanium layer a  
29 lower doped SiGe layer formed on the collector and on undoped  
30 upper SiGe layer formed in the lower layer.

31 5. A method for forming a bipolar transistor structure,  
32 the method comprising:

33 forming a collector region having a first conductivity type  
34 opposite the first conductivity type, the base region including a

5 lower highly doped layer formed on the collection region and a  
6 relatively low doped upper layer formed on the lower; and  
7 forming on emitter region having the first conductivity type  
8 on the upper layer of the base region.

9 6. A method as in claim 5, and wherein the step of  
10 forming the base region comprises:

11 forming a lower doped SiGe layer on the collector utility a  
12 first dopant concentration; and

13 forming an upper doped SiGe layer on the lower SiGe layer  
14 utilizing a second dopant concentration that is less than the first  
15 dopant concentration.

16 7. A method as in claim 6, and wherein the second  
17 dopant concentration is zero.  
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